

Abstract Submitted
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Probing in-plane anisotropy and interlayer interactions in ReS_2 and ReSe_2 by Raman spectroscopy ETIENNE LORCHAT, GUILLAUME FROEHLICHER, STÉPHANE BERCIAUD, IPCMS (CNRS - Université de Strasbourg) — We address the intriguing Raman response of rhenium disulfide (ReS_2) and rhenium diselenide (ReSe_2). These layered semiconductors belong to the family of transition metal dichalcogenides and exhibit significant in-plane anisotropy and can be represented as a distorted $1T$ -phase (octahedral), with considerably lower symmetry than the more extensively studied $2H$ -phase (trigonal prismatic) compounds based on molybdenum or tungsten. Nevertheless, we will demonstrate that the low-frequency rigid layer vibrational modes of N -layer ReS_2 and ReSe_2 can, on the one hand, be described using a linear chain model but, on the other hand, make it possible to directly probe the in-plane anisotropy and to determine the crystal orientation. Since in-plane anisotropy also has a direct impact on the optical and electron transport properties, our work opens avenues for engineering novel optoelectronic devices relying on ReS_2 and ReSe_2 .

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